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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/429,986	10/29/1999	YUJI YAMADA	7217/60017	6609

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EXAMINER

PENDLETON, BRIAN T

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 01/30/2004

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/429,986

Applicant(s)

YAMADA, YUJI

Examiner

Brian T. Pendleton

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Allowable Subject Matter

The indicated allowability of claims 2-3 is withdrawn in view of newly cited references to Numazu et al and Lowe et al. Rejections based on the cited reference(s) follow.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 4, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Numazu et al in view of Lowe et al. In figure 8, Numazu et al teach a system comprising first filter means 24, 25 for processing a one channel audio signal and converting the audio signal to a two channel audio signal, second filter means (operational units 4-7) and output unit 14, 15. The first and second reflected sound generation circuits 24 and 25 each take the input signal and output signals which are processed according to FIR characteristics (see column 17 lines 4-15). Therefore the first filter means processes the input audio signal in accordance with predetermined finite impulse response characteristics. Furthermore, the second filter means uses FIR filters to localize the audio signals from the reflected sound generation circuits 24 and 25. The FIRs 4-7 have different transfer functions which provide uncorrelated processing by setting different delay times inherently. The FIRs also provide reflected

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sound components since they include delay and gain elements (figure 3). Numazu et al do not teach that the output unit is supplied to a headphone. Lowe et al teach a system comprising input signals 120, processor 122, stereo delay buffers 147, 160, and HRTF units 154, 158, 162, 166. The processor 122 takes an input signal and produces signals 131 and 136 for unit to the stereo delay buffer units. The buffer units each provide delay and gain elements to produce left and right early reverberation signals. The output of the buffer units eventually are added to direct sounds and processed by the HRTF units to locate the sound source outside the head of the listener using headphones. As suggested in column 1 lines 51-67, it was desirable to provide a virtual sound source out of the headphone user's head using transfer functions from digital filters, the transfer functions different from those for loudspeaker reproduction. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to substitute the head related transfer functions in the Lowe et al invention for the FIRs 4-7 in Numazu et al and supply headphones in the Numazu et al invention. Claim 1 is met. Regarding claim 3, the second filter means in Numazu et al comprise at least a pair FIR filters. Inherently, the FIR filters contain delay times corresponding to transfer functions, multipliers for multiplying an audio signal by coefficients and an adder. This is shown in figure 3. As to claim 4, it was obvious to have the same transfer function characteristic for the first filter means 24 and 25 since it would have allowed the audio output to be symmetrical, a desirable feature.

Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Numazu et al in view of Lowe et al as applied to claim 1, in further view of Inanaga et al.

The combination of Numazu et al and Lowe et al teaches an apparatus having a first filter means, second filter means and a headphone. The combination does not teach that the headphone has detection means for detecting rotational movement of the listener's head and varying the transfer functions of the second filter means in response to the movement. However, that feature was taught and suggested by Inanaga et al. It was advantageous to have a vibratory gyroscope in a headphone system for the purpose of changing a filter's characteristics since under normal listening conditions without headphones, a listener's experience will change with the rotation of his/her head. Therefore, the use of the gyroscope added more realism to the listening experience. Accordingly, it would have been obvious to one of ordinary skill in the art at the time of invention to use the teaching of Inanaga et al in the invention described by the combination of Numazu et al and Lowe et al. The modified combination would include a gyroscope 30 (having piezoelectric pieces, per claim 6) whose output, which detects head angle, coupled to the FIRs of the second filter means in Numazu et al.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Numazu et al in view of Lowe et al in further view of Inanaga et al in further view of Yamada et al. As discussed above, The combination does not disclose head detection means, specifically a geomagnetic azimuth sensor. Yamada et al teach a headphone system having such sensor and changing the delay times of circuit elements 30 according to head movement. For the same reasons above, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Numazu et al to have a

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geomagnetic azimuth sensor for the purpose of changing delay times of the second filter means in response to head turning.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Knappe et al, US Patent 5,761,295.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Pendleton whose telephone number is (703) 305-9509. The examiner can normally be reached on M-F 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.



Brian Tyrone Pendleton
January 16, 2004



FORESTER W. ISEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 450